OPR 2001

Laser Barcode Scanner

OPTICON

Specifications Manual

All information subject to change without notice.

Document History

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1. Abstract

This manual provides specifications for the OPR 2001 laser barcode scanner.

2. Overview

The OPR 2001 is a handheld laser barcode scanner. The use of a short-wavelength red laser beam enhances visibility when scanning lines.

The OPR 2001 can be configured to scan both positive and negative barcodes. Scanned data is transferred via an RS-232C, USB, or Wedge interface. Auto-trigger settings are available.

The OPR 2001 complies with RoHS.

Supported symbologies:

- JAN/UPC/EAN/ all add-on
- Chinese Post Matrix 2 of 5
- Codabar/NW-7, including ABC and CX
- Code 11
- Code 39: Normal Code 39 / Full ASCII Code 39 / Italian Pharmaceutical
- Code 93
- Code 128: EAN-128
- Composite Codes: UCC/EAN-128 (incl. CC-A/B/C)
- IATA
- Industrial 2of5
- Interleaved 2of5
- ISBN-ISMN-ISSN
- Korean Postal Authority code
- Matrix 2of5
- MicroPDF417
- MSI/Plessey-UK/Plessey
- PDF417
- RSS: RSS-14 (incl. CC-A/B) / RSS-Limited (incl. CC-A/B) / RSS-Expanded (incl. CC-A/B)
- S-Code
- Telepen
- Tri-Optic

3. Physical Features

3.1. Dimensions

W 151.0 x D 56.0 x H 30.5 mm

3.2. Weight

60 grams max. (excluding cable weight)

4. Environmental Specifications

4.1. Operating Temperature and Humidity

Temperature: -5° to +50° C

Humidity: 20 to 85% RH

4.2. Storage Temperature and Humidity

Temperature: -20° to +60° C

Humidity: 10 to 90% RH

4.3. Ambient Light Immunity

Decoding performance is guaranteed when the range of illumination on a barcode surface is between zero and the following values:

Incandescent light	3,000 lx
Fluorescent light	3,000 lx
Sunlight	50,000 lx
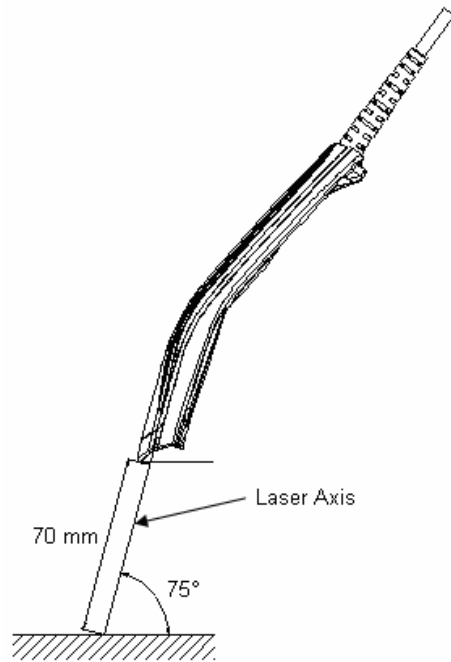
Figure 1: Ambient light immunity

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

PCS:	0.9
Resolution:	0.25 mm
Symbology:	9-digit Code-39
Quiet Zone:	10 mm
N/W Ratio:	1:2.5
Distance:	70 mm
Angle:	$\alpha = 0°$ $\beta = 15°$ $\gamma = 0°$
Curvature:	$R = \infty$
Power Supply Voltage:	5.0 V

Direct light or specular reflection light from a source should be prevented from entering the acceptance area.

5. Electrical Specifications

5.1. RS-232C

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Power supply voltage	V_{DD}	4.5	6.0	6.5	V	
Operating current	I_{OP}	-	90	150	mA	No buzzer
Peak current	I_{PEAK}	-	550	600	mA	
Standby current	I_{PRE}	-	35	70	mA	
Startup time	T_D	-	100	-	ms	

5.2. USB, Wedge

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Power supply voltage	V_{DD}	4.5	5.0	5.5	V	
Operating current	I_{OP}	-	90	150	mA	No buzzer
Peak current	I_{PEAK}	-	450	500	mA	
Standby current	I_{PRE}	-	35	70	mA	
Startup time	T_D	-	100	-	ms	

Conditions

- Connect 1Ω resistance to a power supply line in series and measure the current by the voltage between both ends of resistance.

- Power supply voltage is measured at a connector terminal area.

- The current value depends on the interface type and host computer to which the device is connected.

6. Optical Specifications

6.1. Laser Scanning Specifications

Parameter	Specification	Unit
Light-emitting element	Red laser diode	-
Emission wavelength	650 ±10 (25° C)	nm
Light output	1.0 or less	mW
Scanning method	Bi-directional scanning	-
Scanning speed	100 ±20	scans/s
Scan angle	Scan angle: 54 ±5	°
	Read angle: 44 (Min)	°

6.2. Laser Scanning Standard

6.2.1. Laser Scanning Tilt

Scanning tilt is the vertical difference between the ends of a laser scan line.

- Up to 0.92° in a vertical direction from the scan origin (mirror motor mirror).
- Up to 2.46 mm when measured at 150 mm from the scan origin.

Measurement is done at the center of the laser scan line.

6.2.2. Scanning Curvature

Scanning curvature is the maximum difference between the laser scan line and the line between the ends of the laser scan line.

- Up to 1.17° in a vertical direction from the scan origin (mirror motor mirror).
- Up to 3.06 mm when measured at 150 mm from the scan origin.

Measurement is done from the center of the laser scan line.
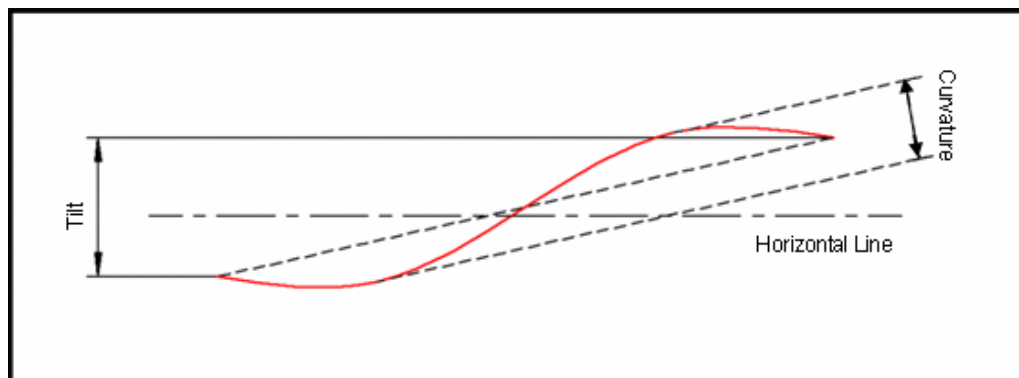
Figure 2: Laser scanning tilt and curvature

7. Technical Specifications

The conditions for technical specifications are as follows, unless otherwise specified in each section.

Conditions

Ambient temperature and humidity	21º C / 70º F, 60% RH
Ambient light	500 to 900 lx
Background	Barcode = black
	Space = white
	Margin = white
	Background of label = black
Power supply voltage	6.0 V (RS-232C) / 5.0 V (USB, Wedge)
Decoding test	Approve the performance when decoding is successful in all ten tests.
	(Decoding is deemed successful when completed in 0.5 seconds or less.)

7.1. Print Contrast Signal (PCS)

0.45 or higher (over 70% of reflectivity of space and quiet zone).

7.2. Scan Area and Resolution

The scan area is a circular area centered around the beam, which appears at various resolutions.
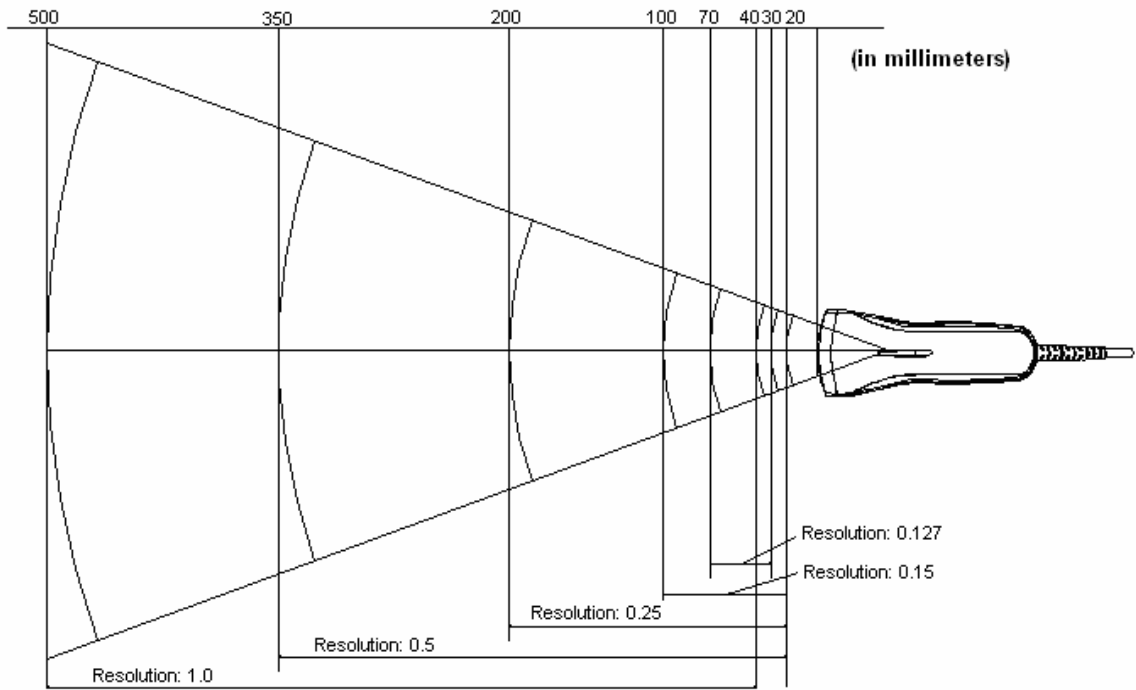
Figure 3: Depth of field.

Resolution	Symbology	PCS	Quiet Zone	Digits	Depth of Field (mm)
1.0 mm	CODE-39	0.9	25 mm	1	40 to 500
0.5 mm	CODE-39	0.9	18 mm	3	20 to 350
0.25 mm	CODE-39	0.9	10 mm	8	20 to 200
0.15 mm	CODE-39	0.9	7 mm	10	20 to 100
0.127 mm	CODE-39	0.9	5 mm	4	30 to 70

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

N/W Ratio: 1:2.5

Angle: α = 0°, β = 15°, γ = 0°

Curvature: R = ∞

7.3. Pitch, Skew, and Tilt

7.3.1. Pitch Angle

Scanning performance is guaranteed when α = ±35°

Figure 4: Pitch

7.3.2. Skew Angle and Dead Zone

Scanning performance is guaranteed when skew angle: β ≤ ±50° (Excluding dead zone)

Dead zone: β = ±8° (There are some areas in which decoding fails due to specular reflection)
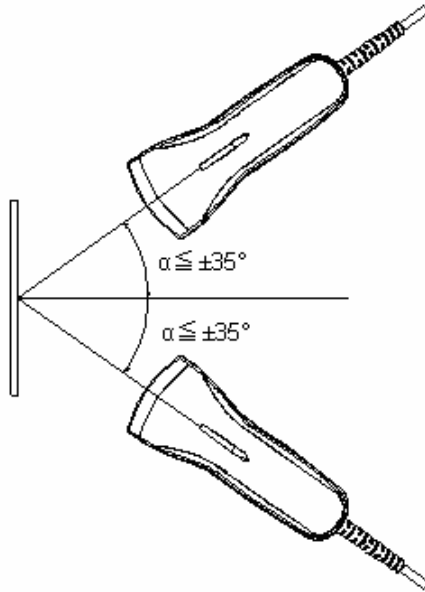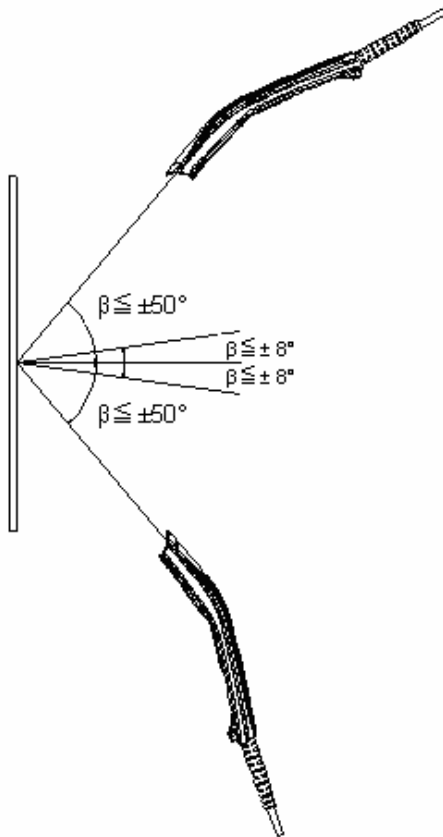

Figure 5: Skew angle and dead zone

7.3.3. Tilt Angle

Scanning performance is guaranteed when γ ≤ ±20°
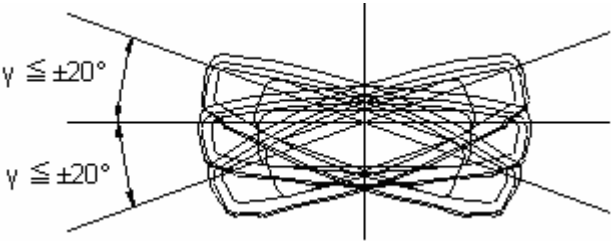
Figure 6: Tilt angle

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

Distance:	70 mm from the front edge of the scanner
Label:	**Pitch, Skew Angle, Dead Zone** PCS = 0.9, Resolution = 0.25 mm, Symbology = 9-digit Code-39, Quiet Zone = 10 mm, N/W Ratio = 1:2.5 **Tilt Angle** PCS = 0.9, Resolution = 0.26 mm, Symbology = 13-digit JAN, Quiet Zone = 10 mm
Angles:	**Pitch angle:** Skew angle: β = +15°, Tilt angle: γ = 0° **Tilt angle:** Pitch angle: α = 0°, Skew angle: β = +15° **Skew angle, Dead zone**: Pitch angle: α = 0°, Tilt angle: γ = 0°
Curvature:	R = ∞

7.4. Curvature

With 8-digit JAN/UPC/EAN barcodes, decoding performance is guaranteed when R = 15 mm.

With 13-digit JAN/UPC/EAN barcodes, decoding performance is guaranteed when R = 20 mm.

Figure 7: Curvature

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

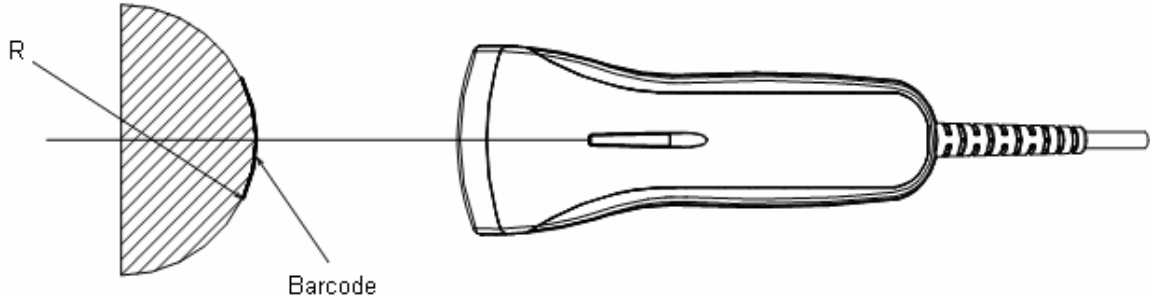| PCS = 0.9, Resolution = 0.26 mm, Quiet Zone = 10 mm	
Distance:	70 mm from the front edge of the scanner
Angle:	Skew Angle β = +15°

8. Interface Specifications

8.1. RS-232C Interface

8.1.1. Settings and Communication

Reading menu barcodes [ZZ] + [U2] + [ZZ] can set the RS-232C interface default.

Item	[U2] setting
Baud rate	9600 BPS
Start/stop bits	1 bit
Data bits	8 bits
Parity bits	No parity
Handshaking	No handshake
Flow control time out	Indefinitely

You can change the communication condition using the menu barcode.

8.1.2. Signal Level

Signal Name	I/O	RS-232C Level (V)	
		Mark/OFF	Space/ON
TxD	OUT	-5 to -15	+5 to +15
RxD	IN	-3 to -15	+3 to +15
RTS	OUT	-5 to -15	+5 to +15
CTS	IN	-3 to -15	+3 to +15

8.1.3. Pin Assignment

Signal	Pin	Notes
NC	1	Open (not connected)
TXD	2	
RXD	3	
---	4	Connected to pin 6 with jumper cable.
GND	5	
---	6	Connected to pin 4 with jumper cable.
CTS	7	
RTS	8	
NC	9	Open (not connected)
FG	SHELL	Shield

Connector: D-sub, 9-pin, Female

Power supply: DC jack, EIAJ voltage Class 2
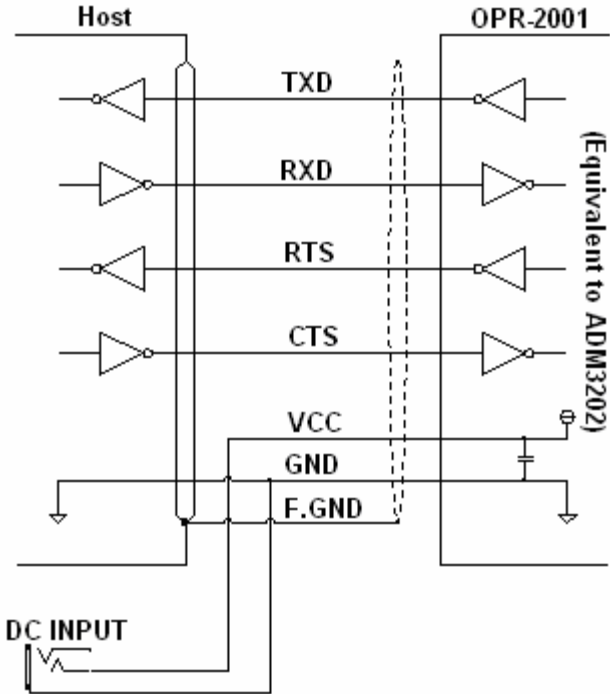
8.1.4. Interface Circuit

Figure 8: Interface circuit

8.1.5. Character Format
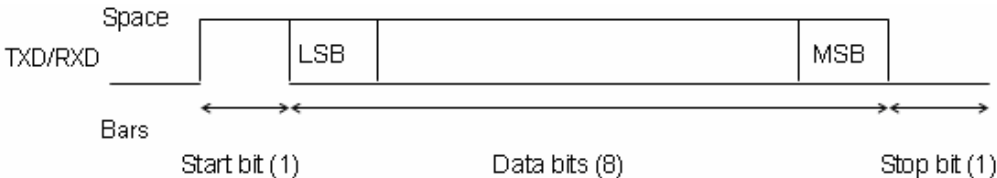
Figure 9:Character format (same for both sending and receiving)

8.1.6. Communication Format

Figure 10: Communication format

8.1.7. Handshaking

Select handshaking options using the menu or command listed below.

Handshaking	Menu/Command
No handshake	P0
BUSY/READY	P1
MODEM	P2
ACK/NAK	P3
ACK/NAK NO RESPONSE	P4

a) No Handshaking

The scanner attempts the communication regardless of the state of the host computer.

Figure 11: No handshaking

b) BUSY/READY

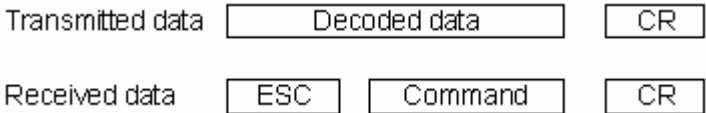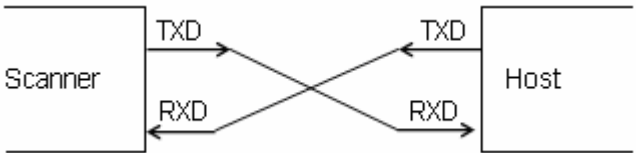The scanner and the host computer notify each other of their state and whether they can receive data with BUSY/READY through an RTS line. They can communicate state to each other through a CTS line when connected as in the following figure.
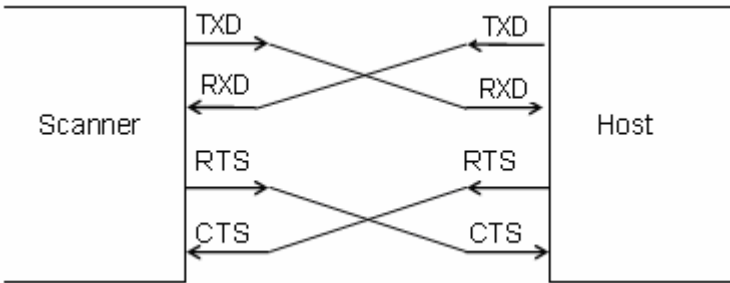
Figure 12: Busy/Ready communication

The scanner stays ON (is able to receive data) except during certain parts of the process, such as receiving data (buzzer command execution), transmitting data, and menu processing. The scanner checks the CTS line before transmitting data. When it is ON, the scanner transmits data. When it is OFF, the scanner waits for it to turn ON within a set time. The scanner will abort transmission with an error indication (buzzer) when the CTS line is not ON within a specified period. The Flow Control time-outs are as follows, and the default setting is "indefinitely" (I0).

Flow Control Time Out	Menu/Command
Indefinitely	I0
100 ms	I1
200 ms	I2
400 ms	I3
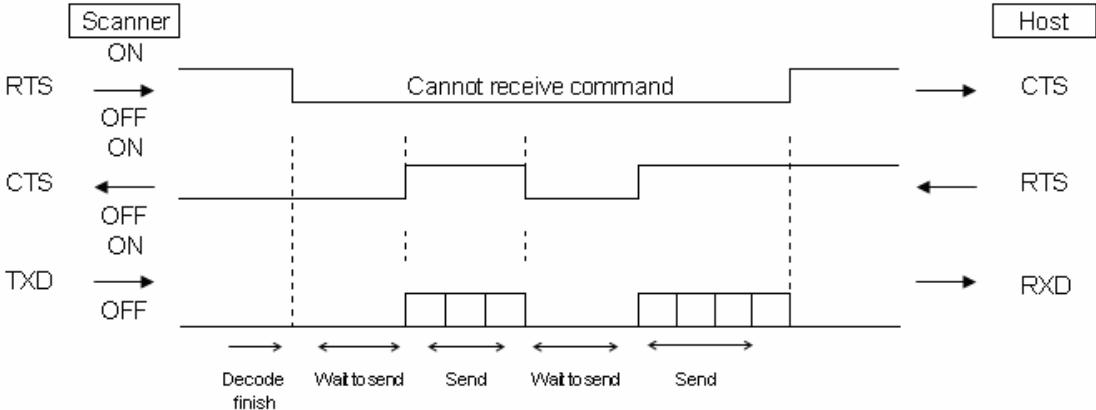
Figure 13: Cannot receive command

CTS, TXD signal timing

When the CTS line (RTS signal of the host) is turned OFF while sending a TXD signal, the scanner transmits one character and waits. When the CTS signal is turned ON while transmitting a character, the character will be transmitted.

Figure 14: Signal timing

Note: When using loopback (wire connection) for RTS, CTS line of the scanner in this setting, *No handshake* is not enabled.

c) MODEM

The scanner turns CTS line ON before transmitting data. Other processes are the same as BUSY/READY.
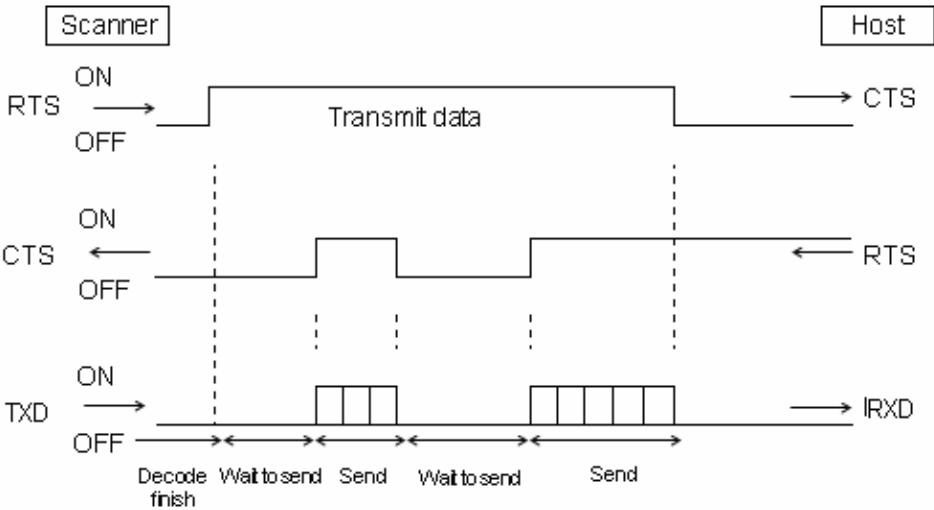
Figure 15: Modem transmit data

d) ACK/NAK

After data has been transmitted, the scanner expects to receive one of the following responses from the host:

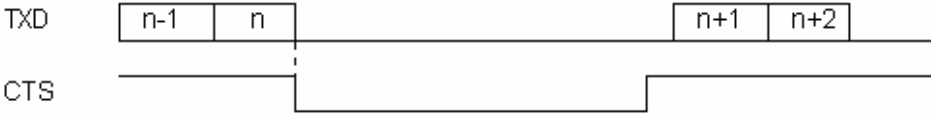- *ACK* response—Action: The scanner completes transmission with the good-read buzzer and returns to the initial state.

- *NAK* response—Action: The scanner sends the data again and waits for the response from the host.

- *DC1* response—Action: The scanner returns to waiting for the trigger, if it has a trigger (the initial state).

- *None* response—Action: The scanner sounds the error buzzer and returns to the initial state.

ACK/NAK timeout can be set as follows using the menu or commands.

ACK/NAK Timeout	Menu/Command
Indefinitely (default)	XI4
100 ms	XI5
500 ms	XI6
1000 ms	XI7

Figure 16: ACK/NAK

e) ACK/NAK NO RESPONSE

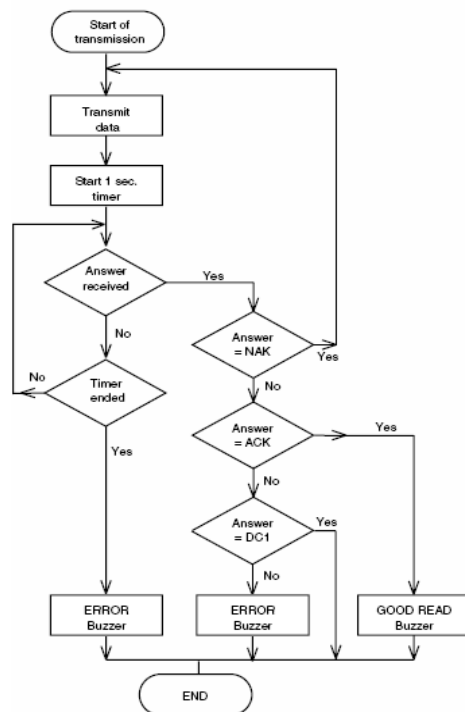When no response from the host is received within the setting time, the scanner assumes an ACK response, and returns to the initial state without the error buzzer. The other actions are the same as ACK/NAK.
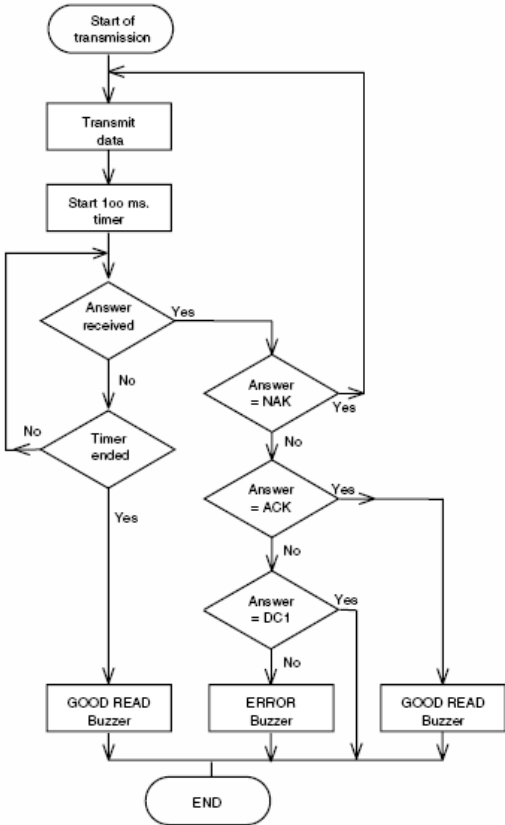
Figure 17: ACK/NAK—No response

8.2. USB Interface Specifications

8.2.1. Settings

a) USB-HID

Reading menu barcodes [ZZ] + [SU] + [ZZ] can set the USB-HID interface default.

The OPR 2001 USB model uses a full-speed USB interface.

b) USB-VCP

Reading menu barcodes [ZZ] + [C01] + [ZZ] can set the USB-VCP interface default.

The OPR 2001 USB model uses a full-speed USB interface.

Note: You must install the USB-VCP driver on the host

8.2.2. Connectors

a) USB "A" connector
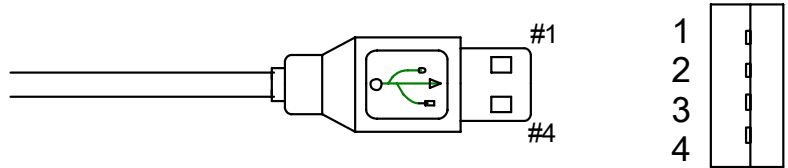
Figure 18: USB "A" connector

Contact Number	Signal Name
1	VCC
2	-DATA
3	+DATA
4	GND

8.2.3. Interface Circuit

Figure 19: Interface circuit

Do not use the keyboard while the scanner is transmitting the data to the host. Doing so may cause failure in data transactions.

8.3. DOS/V Wedge Interface Specification

8.3.1. Settings

a) Desktop PC (When using external keyboard)

Reading menu barcodes [ZZ] + [UB] + [KM] + [ZZ] can set the DOS/V Wedge interface default.

b) Notebook PC (When not using external keyboard)

Reading menu barcodes [ZZ] + [UB] + [KL] + [ZZ] can set the DOS/V Wedge interface default.

8.3.2. Connectors

a) DOS/V Host Connector
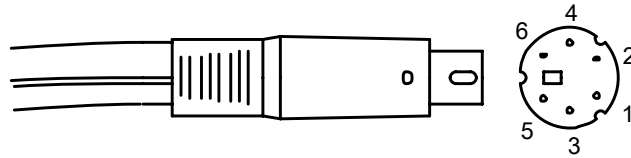
Figure 20: DOS/V host connector

Contact Number	Signal Name
1	CPU_DATA
2	NC
3	GND
4	VCC
5	CPU_CLK
6	NC

b) DOS/V Keyboard Connector
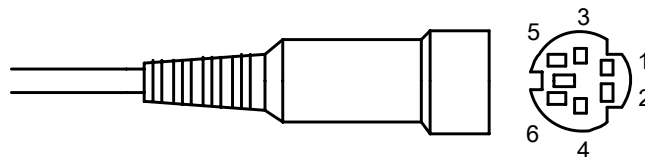
Figure 21: DOS/V keyboard connector

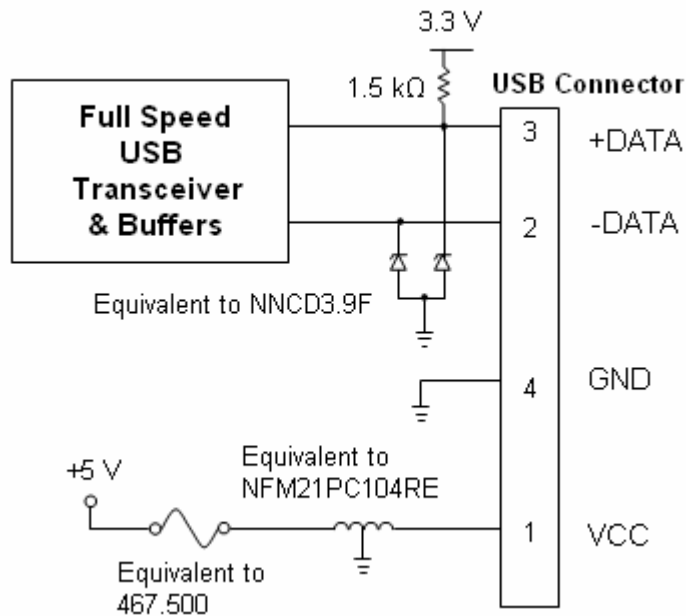| Contact Number	Signal Name
1	KEY_DATA
2	NC
3	GND
4	VCC
5	KEY_CLK
6	NC

Do not use the keyboard while the scanner is transmitting the data to the host. Doing so may cause failure in data transactions.

9. Cable and Connector

9.1. RS-232C Cable

(Standard specification)

Type:	Straight
Diameter:	Φ4.8±0.5 mm
Length:	1500 +50, -0 mm
Cores:	6 insulated wires, 1 conductive wire
Weight:	Approximately 40 g
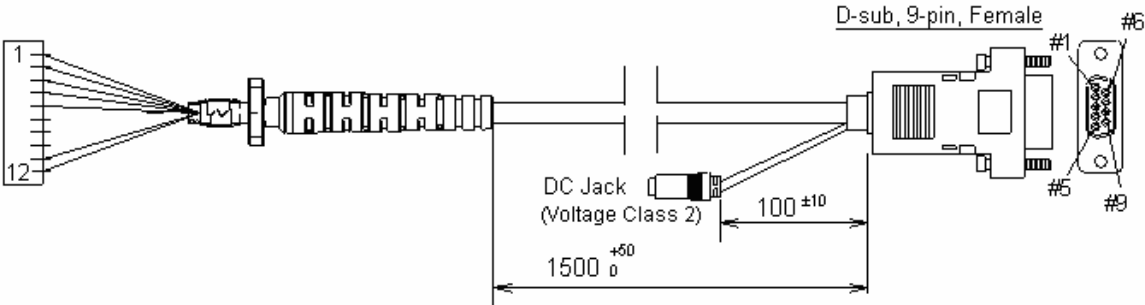
Figure 22: RS-232C cable

9.2. USB Cable

(Standard specification)

Type:	Straight
Diameter:	Φ4.8 ±0.5 mm
Length:	1500 +50, -0 mm
Cores:	4 insulated wires, 1 conductive wire
Weight:	Approximately 40 g
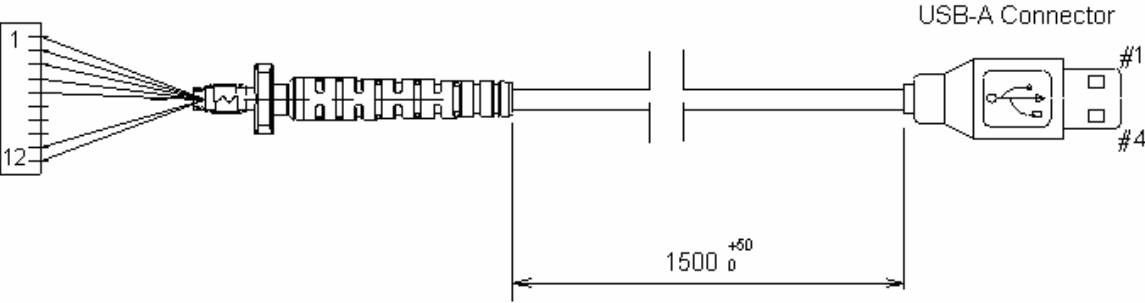
Figure 23: USB cable

9.3. Wedge Cable

(Standard specification)

Type:	Y cable
Diameter:	Φ4.8 ±0.5 mm
Length:	1500 +50, -0 mm
Cores:	6 insulated wires, 1 conductive wire
Weight:	Approximately 50 g
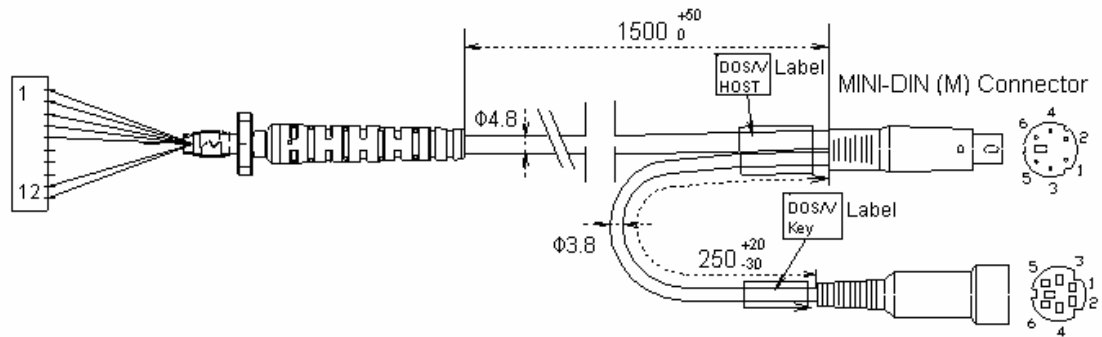
Figure 24: Wedge cable

9.4. Connector Specification (Scanner Side)

CN1 (12-pin)

Pin No	RS-232C	USB	Wedge
1	GND	GND	GND
2	RXD	---	---
3	TXD	---	---
4	CTS	---	---
5	RTS	---	---
6	NC	---	---
7	NC	- DATA	KEY_CLK
8	NC	+ DATA	KEY_DATA
9	NC	---	CPU_CLK
10	NC	---	CPU_DATA
11	VCC	VCC	VCC
12	FG (shield)	FG (shield)	FG (shield)

10. Default Settings

10.1. Barcodes

Scan the following menu barcodes to return to the default settings.

RS-232C Default

Functions	Menu labels	Menu codes
SET		ZZ
RS232C		U2
END		ZZ

USB-HID Default

Functions	Menu labels	Menu codes
SET		ZZ
USB-HID		SU
END		ZZ

USB-VCP Default

Functions	Menu labels	Menu codes
SET		ZZ
USB-COM		C01
END		ZZ

Wedge Default (with external keyboard)

Functions	Menu labels	Menu codes
SET		ZZ
AT wedge default		UB
With keyboard		KM
END		ZZ

Wedge Default (without external keyboard)

Functions	Menu labels	Menu codes
SET		ZZ
AT wedge default		UB
With keyboard		KL
END		ZZ

10.2. Default Settings 1: Readable Codes

Symbology	Read	Transmit Code Length	Transmit CD	Calculate CD	Set Prefix	Set Suffix	Others
UPC-A	■	X	■	■	—	CR	
UPC-A Add-on	X	X	■	■	—	CR	
UPC-E	■	X	■	■	—	CR	
UPC-E Add-on	X	X	■	■	—	CR	
EAN-13	■	X	■	■	—	CR	
EAN-13 Add-on	X	X	■	■	—	CR	
EAN-8	■	X	■	■	—	CR	
EAN-8 Add-on	X	X	■	■	—	CR	
Chinese Post Matrix 2of5	X	X	■	X	—	CR	
Code-11	X	X	X	■	—	CR	
Code-39	■	X	■	X	—	CR	Not transmit ST/SP
Code-39 Trioptic	■	X	—	—	—	CR	Not transmit ST/SP
Code-93	■	X	X	■	—	CR	
Code-128	■	X	X	■	—	CR	
EAN-128	X	X	X	■	—	CR	
IATA	■	X	■	X	—	CR	

Symbology	Read	Transmit Code Length	Transmit CD	Calculate CD	Set Prefix	Set Suffix	Others
Industrial2of5	■	X	■	X	—	CR	
Interleaved2of5	■	X	■	X	—	CR	
Korean Postal Code (Code 3of5)	X	X	X	■	—	CR	
Matrix2of5	X	X	■	X	—	CR	
MicroPDF417	X	X	—	—	—	CR	
MSI/Plessey	■	X	■CD1	■CD1	—	CR	
NW-7(CODABAR)	■	X	■	X	—	CR	Not transmit ST/SP
PDF417	X	X	—	—	—	CR	
RSS-14	X	X	■	■	—	CR	
RSS-limited	X	X	■	■	—	CR	
RSS-expanded	X	X	■	■	—	CR	
S-Code	■	X	■	X	—	CR	
Telepen	■	X	X	■	—	CR	
UK/Plessey	■	X	■	■	—	CR	

Notes:

- In the "Reading" column, "■" means "Enable reading" and "X" means "Disable reading."

- In the "Transmit code length" column, "■" means "Transmit code length" and "X" means "Do not transmit code length."

- In the "Transmit CD" column, "■" means "Transmit check digit" and "X" means "Do not transmit check digit."

- In the "Calculate CD" column, "■" means "Calculate check digit" and "X" means "Do not calculate check digit."

- "— " means "not supported."

- In the "Prefix" column, "—" means "there is no prefix setting."

10.3. Default Settings 2: Read Options, Trigger, Buzzer

Item		Default Setting
Setting the number of characters		Fixed length OFF all codes
Read mode		Single read
Multiple read reset time		500 ms
Add-on wait time		500 ms
Multiple columns read		Disabled
Redundancy	Default option ([X0] setting)	Read 1 times, redundancy = 0
	Other options ([X1 .. X3] setting) ([BS .. BW] setting)	Read n times, redundancy = n+1 for following symbologies and lengths: • Code39 with length <= 5 • MSI/Plessey with length <= 4 • IATA,Industrial 2of5, Interleaved 2of5 with length <= 8 • Matrix 2of5 (& Chin.Post), Scode with length <= 8 • Codabar (NW7) with all lengths • Code-11 with length <= 5
Trigger switch		Enabled
Trigger repeat		Disable trigger repeat
Auto trigger		Disable auto trigger
Margin check		Margin check normal
Buzzer duration		50 ms
Buzzer tone		3 kHz (single tone)
Buzzer loudness		Loud (Maximum)
Buzzer timing		Buzzer before transmission
Startup buzzer		Enable startup buzzer
Indicator duration		200 ms

11. Serial Number

The serial number as shown below is affixed to the scanner.
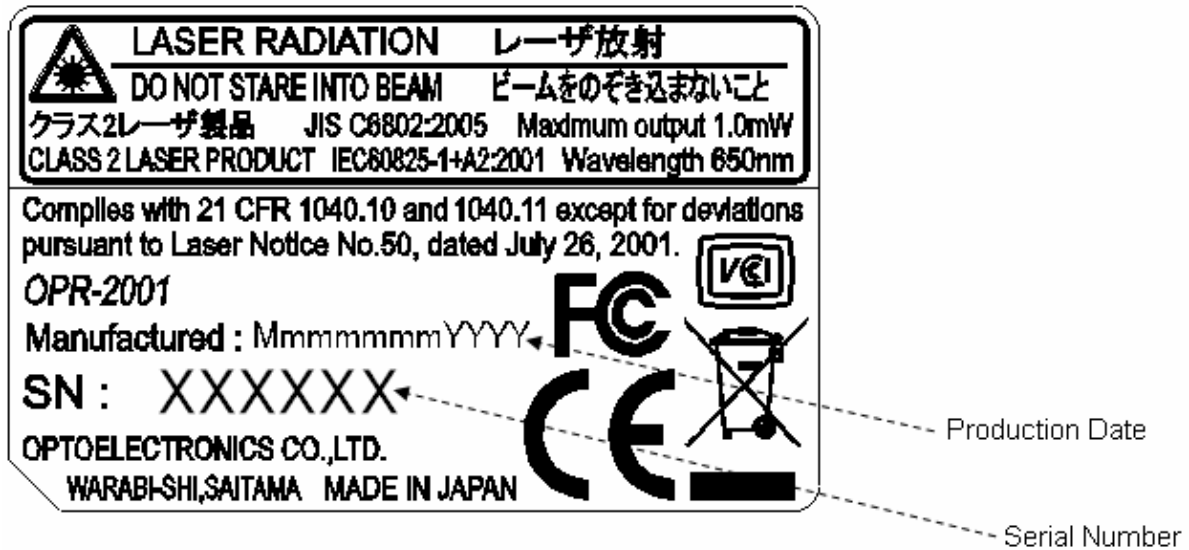
Figure 25: Serial number diagram

12. Packaging Specifications

12.1. Individual Packaging Specification

Put the scanner in a protective foam bag and place it in a single packing box.

Size of the package (after assembly: 245 (W) x 110 (D) x 40 (H) mm

12.2. Collective Packaging Specification

Put 50 individually packaged OPR 2001 scanners in a collective packaging box.

Dimensions: 650 mm (W) x 550 mm (D) x 250 mm (H)

Note: The "RO" mark labeled on the package tray or package box guarantees that the applicable product has passed our test of RoHS restrictions compliance (the restriction of the use of certain hazardous substances in electrical and electronic equipment, 2002/95/EC). However, this document does **not** have any legal weight in the European Union.

13. Durability

13.1. Electrical Noise

No malfunction occurred when sinusoidal electrical noise (10Hz -100kHz, < 0.1Vpp) was added to a power supply line.

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

PCS:	0.9
Resolution:	0.25 mm
Symbology:	9-digit Code-39
Quiet Zone:	10 mm
N/W Ratio:	1:2.5
Distance:	90 mm
Angle:	$\alpha = 0°$ $\beta = 15°$ $\gamma = 0°$
Curvature:	$R = \infty$
Power Supply Voltage:	5.0 V

13.2. Shock

13.2.1. Drop Test (without packaging)

No malfunction occurred after the following drop test.

Drop Test: Drop the scanner from a height of 150 cm onto a concrete floor three times on each of 5 sides.
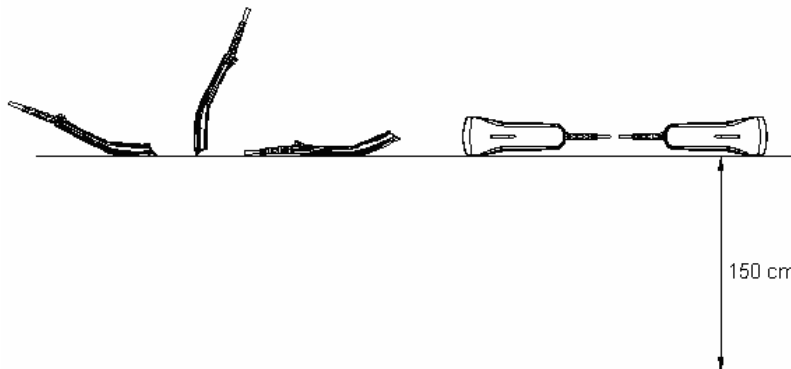

150 cm

Figure 26: Drop test

13.2.2. Drop Test (with individual packaging)

No malfunction occurred after the following drop test.

Drop Test: Drop the scanner from a height of 150 cm onto a concrete floor on each of one corner, three edges, and six sides (10 drop tests in total).

13.3. Vibration Strength

No malfunction occurred after the following vibration test.

Vibration Test: Increase the frequency of the vibration from 10 Hz to 100 Hz with accelerated velocity 19.6m/s^2 (2G) for 60 minutes in non-operating state. Repeat this routine in each X, Y, Z direction once for 60 minutes each.

13.4. Static Electricity

Air discharge:	10 kV Max. (No malfunction)
	15 kV Max. (No destruction)
Measurement environment:	Use electrostatic testing device compliant with IEC 61000-4-2
Discharge resistance:	330 Ω
Capacitor charging:	150 pF

13.5. Dust and Drip Proof

IEC IP42

13.6. Cable Strength

13.6.1. Cable Pulling Test

No malfunction occurred after the following pulling test.

Pulling test: Fix the scanner and pull the cable with the force of 2.5 kg (24.5N) for 1 second. Repeat 20 times.

13.6.2. Cable Tail Bending Test

No malfunction occurred after the following bending test.

Bending test: Fix the scanner and attach a weight of 500 grams (4.9N); swing the cable back and forth at an angle of 90°. Repeat it 1,000,000 times.
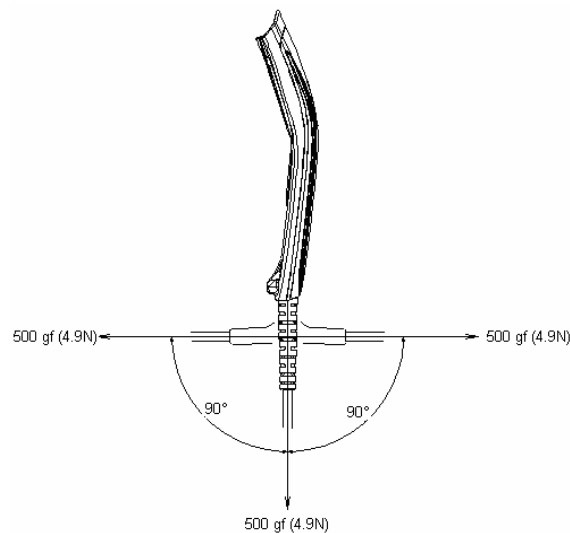

Figure 27: Cable tail bending test

14. Reliability

MTBF (Mean Time Between Failures) of this product is 10,000 hours.

The estimate of MTBF is based on standard operation of the product within the recommended temperature range and without extreme electronic or mechanical shock.

15. Auto Trigger (Option)

The product has an optional auto trigger setting, which starts barcode reading automatically by using sensor detection. The scanner starts barcode reading after detecting reflection from the surface when the auto trigger is used.

Auto trigger distance: 50 ±10 mm from the edge of the scanner.

Conditions

|	
Moving Speed:	100 ±10 mm/s (the moving direction is not specified)
Angle:	Skew angle, excluding Pitch Angle and Dead Zone, specified in section 7.3 Pitch, Skew and Tilt.
Environmental Temperature and Humidity:	Room temperature and humidity
Environmental Illuminance:	500 to 900 lx

Conditions for the auto trigger:	1. Barcode sheet: OPTOELECTRONICS Test Sheet (white)
	   Background: OPTOELECTRONICS Test Sheet (black)
	2. Barcode sheet: OPTOELECTRONICS Test Sheet (black)
	   Background: OPTOELECTRONICS Test Sheet (white)
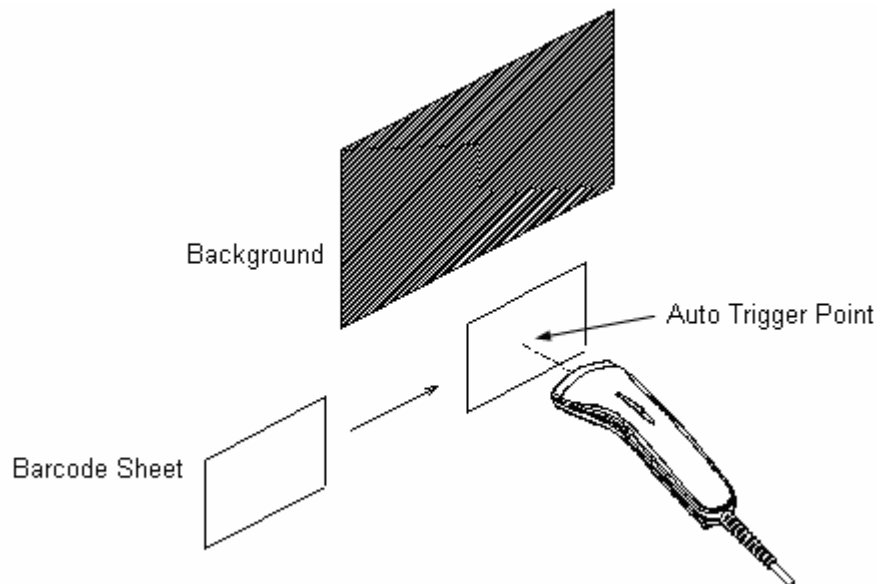
Figure 28: Auto trigger operation

Auto trigger can be enabled in 2 ways:

- Stand detection mode: This option enables auto trigger automatically in case the scanner is inserted into the stand.

- Normal auto trigger mode.

*Descriptions in ( ) show menu IDs.

Figure 29: Trigger options

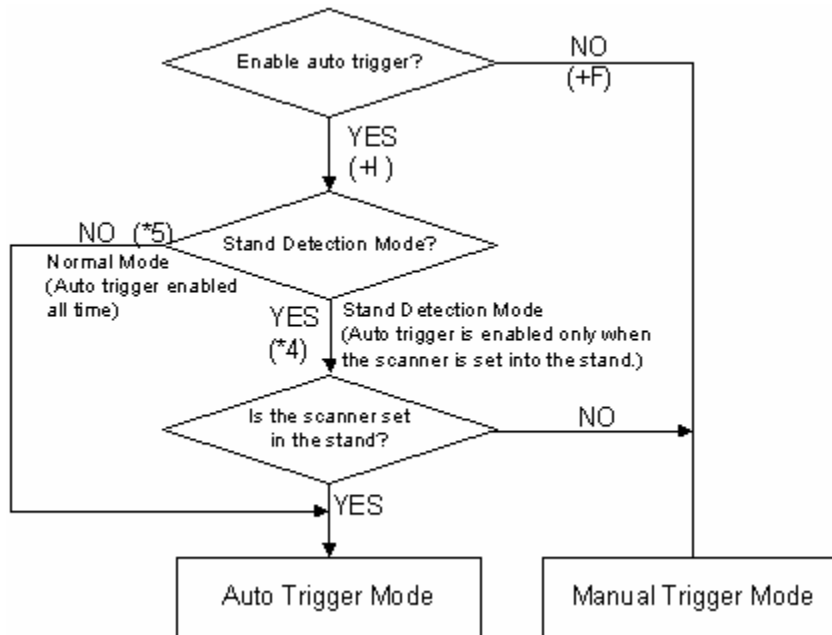## 15.1. Auto Trigger Settings

15.1.1. Stand Only

Enable auto trigger only when the scanner is inserted into the stand.

Functions	Menu labels	Menu codes
SET		ZZ
Enable auto trigger		+I
Enable auto trigger stand detection		*4
END		ZZ

(If the scanner is removed from the stand, auto trigger is disabled and the scanner should be triggered manually.)

15.1.2. Always

Enable auto trigger all the time.

Functions	Menu labels	Menu codes
SET		ZZ
Enable auto trigger		+I
Disable auto trigger stand detection		*5
END		ZZ

15.1.3. Manually

Only trigger manually (default).

Functions	Menu labels	Menu codes
SET		ZZ
Disable auto trigger		+F
Disable auto trigger stand detection		*5
END		ZZ

A magnetic switch and a magnet are used for stand detection operation. Therefore, auto trigger may be activated when there is a magnetic substance nearby.

16. Regulatory Compliance

16.1. Laser Safety

JIS C 6802:2005 Class 2

IEC60825-1+A2:2001 Class 2

CDRH Class II

16.2. Product Safety

EN60950-1: 2001

IEC60950-1: 2001

16.3. EMC

EN55022

EN55024

VCCI Class B: This is a Class B product, to be used in a domestic environment based on the Technical Requirement of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Please install and use the equipment according to the instruction manual.

FCC Part 15 Subpart B Class B: This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

16.4. Compliance to RoHS

RoHS: The restriction of the use of certain hazardous substances in electrical and electronic equipment, 2002/95 EC

17. Safety

Handle this product carefully. Do not deliberately subject it to any of the following.

17.1. Shock

- Do not throw or drop the scanner.
- Do not place heavy objects on the cables.

17.2. Temperature Conditions

- Do not use the scanner at temperatures outside the specified range.
- Do not pour boiling water on the scanner.
- Do not throw the scanner into the fire.
- Do not forcibly bend the cables at low temperatures.

17.3. Foreign Materials

- Do not immerse the scanner in liquids.
- Do not subject the scanner to chemicals.

17.4. Other

- Do not plug/unplug the connectors before disconnecting the power.
- Do not disassemble this product.
- Do not use the scanner near a radio or a TV receiver. It may cause reception problems.
- The scanner may be damaged by voltage drops.
- The scanner may not perform properly in environments when placed near a flickering light, such as a computer monitor, television, etc.
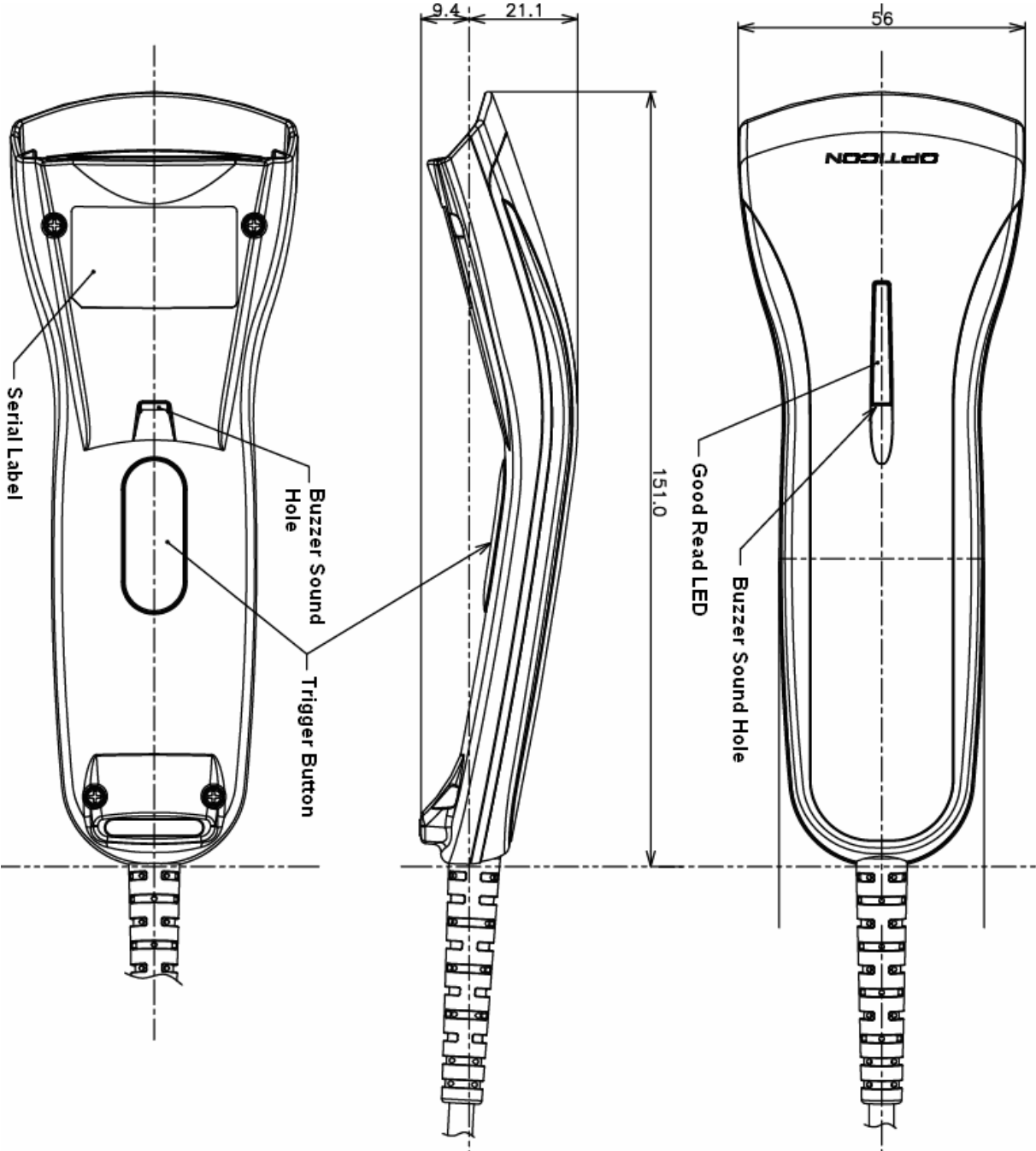
18. Mechanical Drawing

Dimensions: 151.0 mm x 56.0 mm x 30.5 mm (except protruding parts)

Figure 30: Mechanical drawing